



*Excellence in Engineering, Consulting, Testing and Inspection*

TENSILE PROPERTIES OF PLASTICS (ASTM D 638)

TYPE II - 6000 LBS CELL

Test type: Tensile

Instron Corporation  
 Series IX Automated Materials Testing System 6.05  
 Test Date: 12 Apr 2008

Operator name: E. CARRILLO

Sample Identification: 8F29-1T4  
 Interface Type: 42/43/4400 Series

Sample Type: ASTM

Machine Parameters of test:

Sample Rate (pts/sec): 10.000  
 Crosshead Speed (in/min): .2000

Humidity (%): 50  
 Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.25600	.25600	.25600	.27400	.24600
Thickness (in)	.14900	.15300	.15300	.16700	.16000
Spec gauge len (in)	2.0000	2.0000	2.0000	2.0000	2.0000
Grip distance: (in)	5.3000	5.3000	5.3000	5.3000	5.3000

Out of 5 specimens, 0 excluded.

Sample comments: SAMPLE SET 1, . 5600 PLATE 2

Specimen Number	ROLL DIR.	Strength at Break (psi)	Elongation at Break (%)
1		15020.	8.000
2		16380.	7.450
3		12570.	7.050
4		12250.	7.400
5		13100.	7.100
Mean:		13860.	7.400
Standard Deviation:		1769.	.379
Minimum:		12250.	7.050
Maximum:		16380.	8.000



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TYPE II - 6000 LBS CELL

Test type: Tensile

Instron Corporation

Series IX Automated Materials Testing System 6.05

Operator name: E. CARRILLO

Test Date: 12 Apr 2008

Sample Identification: 8F29-1T1

Sample Type: ASTM

Interface Type: 42/43/4400 Series

Machine Parameters of test:

Sample Rate (pts/sec): 10.000

Humidity ( % ): 50

Crosshead Speed (in/min ): .2000

Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.26300	.25000	.26000	.25700	.25800
Thickness (in)	.17500	.17500	.18700	.17200	.17900
Spec gauge len (in)	2.0000	2.0000	2.0000	2.0000	2.0000
Grip distance: (in)	5.3000	5.3000	5.3000	5.3000	5.3000

Out of 5 specimens, 0 excluded.

Sample comments: SAMPLE SET 1, 6800 PLATE 1

Specimen Number	ROLL DIR.	Strength at Break (psi)	Elongation at Break (%)
1		17960.	7.050
2		16070.	7.400
3		14210.	6.300
4		16200.	6.950
5		16570.	7.700
Mean:		16200.	7.080
Standard Deviation:		1344.	.527
Minimum:		14210.	6.300
Maximum:		17960.	7.700



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COMPRESSIVE PROPERTIES OF RIGID PLASTICS (ASTM D 695)

Test type: Compressive

Instron Corporation

Operator name: K. PHOUANGSAVANH

Series IX Automated Materials Testing System 6.05

Test Date: 11 Apr 2008

Sample Identification: 8F29-1C4

Sample Type: ASTM

Interface Type: 42/43/4400 Series

Machine Parameters of test:

Sample Rate (pts/sec): 10.000

Humidity ( % ): 50

Crosshead Speed (in/min ): .0500

Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.58600	.58200	.58000	.57600	.57100
Thickness (in)	.14700	.16200	.16000	.16200	.16600
Spec gauge len (in)	2.0000	2.0200	2.0200	2.0300	2.0200
Platen Separ. (in)	2.5000	2.5000	2.5000	2.5000	2.5000

Out of 5 specimens, 0 excluded.

Sample comments: SAMPLE SET 1, 5600 PLATE 2

Specimen Number	Compres. Strength (psi)	Modulus (psi)
1	9723.	664900.
2	8081.	600900.
3	8960.	601900.
4	9770.	684900.
5	8667.	630500.
Mean:	9040.	636600.
Standard Deviation:	719.	37560.



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COMPRESSIVE PROPERTIES OF RIGID PLASTICS (ASTM D 695)

Test type: Compressive

Instron Corporation

Operator name: K. PHOUANGSAVANH

Series IX Automated Materials Testing System 6.05

Test Date: 11 Apr 2008

Sample Identification: 8F29-1C1

Sample Type: ASTM

Interface Type: 42/43/4400 Series

Machine Parameters of test:

Sample Rate (pts/sec): 10.000

Humidity (%): 50

Crosshead Speed (in/min): .0500

Temperature (deg. F): 71

Dimensions:

Spec. 1 Spec. 2 Spec. 3 Spec. 4 Spec. 5

Width (in)	.53600	.53600	.53700	.53500	.53400
Thickness (in)	.15400	.15900	.19200	.18500	.15400
Spec gauge len (in)	1.9800	1.9800	2.0000	2.0000	1.9800
Platen Separ. (in)	2.5000	2.5000	2.5000	2.5000	2.5000

Out of 5 specimens, 0 excluded.

Sample comments: SAMPLE SFT 1, 6800 PLATE 1

Specimen Number	Compres. Strength (psi)	Modulus (psi)
1	11890.	821700.
2	10000.	813200.
3	11690.	735100.
4	12480.	797200.
5	12110.	888700.
Mean:	11630.	811200.
Standard Deviation:	958.	55010.



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FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SPAN = 2.5".

Flexural 3 point bend

Operator name: E. CARRILLO

Sample Identification: 8F29-1-4

Interface Type: 42/43/4400 Series

Machine Parameters of test:

Sample Rate (pts/sec): 10.000

Crosshead Speed (in/min): .0660

Instron Corporation

Series IX Automated Materials Testing System 6.05

Test Date: 11 Apr 2008

Sample Type: ASTM

Humidity (%): 50

Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56400	.55400	.55000	.56200	.56000
Depth (in)	.16500	.16800	.16800	.16900	.17400
Span (in)	2.5000	2.5000	2.5000	2.5000	2.5000

Out of 5 specimens, 0 excluded.

Sample comments: SAMPLE SET 1, 5600 PLATE 2

Specimen Number	Displcment at Yield (in)	Strain at Yield (in/in)	Load at Yield (lbs)	Stress at Yield (psi)	Modulus Of Elasticity (psi)
1	.2282	.0361	147.6	36047.1	1162965
2	.2023	.0326	143.7	34463.5	1212408
3	.2051	.0331	138.0	32741.9	1139656
4	.2062	.0335	141.5	33058.1	1129480
5	.1954	.0326	151.1	33420.2	1195439
Mean:	.2075	.0336	144.4	33946.2	1167990.
Standard Deviation:	.0123	.0015	5.1	1341.4	35488.
Minimum:	.1954	.0326	138.0	32741.9	1129480.
Maximum:	.2282	.0361	151.1	36047.1	1212408.



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FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)

SPAN = 2.5".

Flexural 3 point bend

Instron Corporation

Series IX Automated Materials Testing System 6.05

Operator name: K. PHOUANGSAVANH

Test Date: 10 Apr 2008

Sample Identification: 8F29-1-1

Sample Type: ASTM

Interface Type: 42/43/4400 Series

Machine Parameters of test:

Sample Rate (pts/sec): 10.000

Humidity ( % ): 50

Crosshead Speed (in/min ): .0660

Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.56500	.54900	.55300	.55900	.53600
Depth (in)	.17000	.17700	.17800	.18000	.18400
Span (in)	2.5000	2.5000	2.5000	2.5000	2.5000

Out of 5 specimens, 0 excluded.

Sample comments: SAMPLE SET 1, 6800 PLATE 1

Specimen Number	Displcmer. at Yield (in)	Strain at Yield (in/in)	Load at Yield (lbs)	Stress at Yield (psi)	Modulus Of Elasticity (psi)
1	.2432	.0397	183.9	42234.4	1356379
2	.2211	.0376	177.8	38765.4	1340176
3	.2218	.0379	180.4	38610.3	1290517
4	.2183	.0377	190.1	39360.1	1286453
5	.2180	.0385	195.3	40358.3	1386474
Mean:	.2245	.0383	185.5	39865.7	1332000.
Standard Deviation:	.0106	.0009	7.2	1491.3	43081.
Minimum:	.2180	.0376	177.8	38610.3	1286453.
Maximum:	.2432	.0397	195.3	42234.4	1386474.



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**TENSILE PROPERTIES OF PLASTICS (ASTM D 638)**

TYPE II - 6000 LBS CELL

Test type: Tensile

Instron Corporation  
 Series IX Automated Materials Testing System 6.05  
 Test Date: 15 Feb 2005

Operator name: E. CARRILLO

Sample Type: ASTM

Sample Identification: 5F25-1T1  
 Interface Type: 42/43/4400 Series

Machine Parameters of test:

Sample Rate (pts/sec): 10.000  
 Crosshead Speed (in/min): .2000

Humidity (%): 50  
 Temperature (deg. F): 71

**Dimensions:**

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.23000	.25900	.21800	.22300	.22300
Thickness (in)	.15300	.14400	.14800	.14400	.14900
Spec gauge len (in)	2.0000	2.0000	2.0000	2.0000	2.0000
Grip distance: (in)	5.3000	5.3000	5.3000	5.3000	5.3000

Out of 5 specimens, 0 excluded.

Sample comments: 11600-0105

Specimen Number	ROLL DIR.	Strength at Break (psi)	Elongation at Break (%)
1		44250.	11.05
2		39550.	11.45
3		37440.	11.55
4		40300.	12.95
5		43310.	12.60
Mean:		40970.	11.92
Standard Deviation:		2789.	.81
Minimum:		37440.	11.05
Maximum:		44250.	12.95



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COMPRESSIVE PROPERTIES OF RIGID PLASTICS (ASTM D 695)

Test type: Compressive

Operator name: K. PHOUANGSAVANH

Sample Identification: 5F25-1C1  
Interface Type: 42/43/4400 Series  
Machine Parameters of test:

Sample Rate (pts/sec): 10.000  
Crosshead Speed (in/min): .0500

Instron Corporation  
Series IX Automated Materials Testing System 6.05  
Test Date: 23 Feb 2005

Sample Type: ASTM

Humidity (%): 50  
Temperature (deg. F): 71

Dimensions:

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.53100	.55400	.54000	.54000	.53900
Thickness (in)	.15600	.16400	.15500	.15800	.15800
Spec gauge len (in)	2.5500	2.5500	2.5400	2.5500	2.5500
Platen Separ. (in)	2.5500	2.5500	2.5500	2.5500	2.5500

Out of 5 specimens, 0 excluded.  
Sample comments: 11600-0105

Specimen Number	Compres. Strength (psi)	Modulus (psi)
1	13740.	1621000.
2	13700.	1476000.
3	12810.	1625000.
4	15450.	1493000.
5	15030.	1632000.
Mean:	14150.	1570000.
Standard Deviation:	1076.	77630.





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**FLEXURAL PROPERTIES OF PLASTICS (ASTM D790)**

SUPPORT SPAN = 2.5"

Flexural 3 point bend

Operator name: K. PHOUANGSAVANH

Sample Identification: 5F25-1-1  
 Interface Type: 42/43/4400 Series  
 Machine Parameters of test:

Sample Rate (pts/sec): 10.000  
 Crosshead Speed (in/min): .0650

Instron Corporation  
 Series IX Automated Materials Testing System 6.05  
 Test Date: 15 Feb 2005

Sample Type: ASTM

Humidity (%): 50  
 Temperature (deg. F): 71

**Dimensions:**

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5
Width (in)	.54700	.55800	.55800	.55100	.55000
Depth (in)	.15500	.15600	.15900	.16400	.15800
Span (in)	2.5000	2.5000	2.5000	2.5000	2.5000

Out of 5 specimens, 0 excluded.  
 Sample comments: 11600-0105

Specimen Number	Displcmnt at Yield (in)	Strain at Yield (in/in)	Load at Yield (lbs)	Stress at Yield (psi)	Modulus Of Elasticity (psi)
1	.1849	.0275	159.5	45513.6	1837261
2	.2088	.0313	185.2	51143.3	1785840
3	.2211	.0337	204.2	54282.3	1815714
4	.2115	.0333	202.8	51316.8	1728949
5	.1972	.0299	173.2	47304.5	1747943
Mean:	.2047	.0311	185.0	49912.1	1783142.
Standard Deviation:	.0140	.0026	19.2	3490.5	45202.
Minimum:	.1849	.0275	159.5	45513.6	1728949.
Maximum:	.2211	.0337	204.2	54282.3	1837261.



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May 14, 2008

**HTS Report #:**

**PTT08F29.001B1.Doc**

Mr. Robert C. Putman  
 Poly-Triplex Technologies  
 P.O. Box 398, 495 St. Johns Road  
 Bonifay, FL 32425

Customer Project Name:  
 Customer Project #:  
 Date Sample Received: 4/07/08  
 Date Sample Tested: 4/15/08

2 Fiberglass plates were delivered to HTS' laboratory for testing. The Samples were tested in accordance with ASTM D695, ASTM D638 Type II, ASTM D790 Method I Procedure A. A Support Span-to-Depth Ratio of 16 to 1 was used as specified in the test standard ASTM D790. Thickness measurements, compressive strength, compressive modulus, tensile strength, tensile elongation, flexural stress and flexural modulus of elasticity tests were performed on each sample. Five (5) specimens were cut and tested from each sample. The results summarized and reported below are averages of the five (5) specimens. A test report for each sample is attached.

SAMPLE ID	COMPRESSIVE STRENGTH (psi) ASTM D 795	COMPRESSIVE MODULUS (psi) ASTM D 795	TENSILE STRENGTH (psi) ASTM D 638	TENSILE ELONGATION (%) ASTM D 638	FLEXURAL STRENGTH (psi) ASTM D 790	FLEXURAL MODULUS (psi) ASTM D 790
Set 1, 6800 Plate 1	11,630	811,200	16,200	7.08	39,865.7	1,332,000
Set 1, 5600 Plate 2	9,040	636,600	13,860	7.40	33,946.2	1,167,990

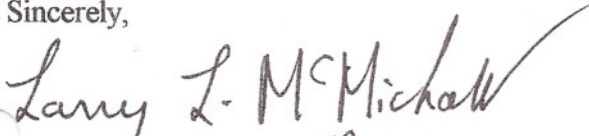
The following table contains the thickness measurements for each individual specimen tested.

**MEASUREMENT OF THICKNESS FOR CURED IN PLACE PIPE LINER  
ASTM D 2122**

Sample Set#	Sample ID	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Combined Total Average/Specimen	
										in	mm
1	6800 Plate 1	.152	.152	.178	.158	.178	.185	.163	.155	0.165	4.2
1	5600 Plate 2	.148	.150	.150	.161	.154	.158	.145	.156	0.153	3.9

Technician	E. Carrillo
Time	4 hrs

Sincerely,



Larry L. McMichael *KP*  
Vice President

This test report relates only to the items tested and shall not be reproduced except in full without approval of HTS, Inc.

